REMARKS

The *Office Action* dated February 21, 2001 has been carefully reviewed, together with the prior art newly cited in connection with the rejection of the claims. For the reasons set forth below, it is believed that the application is in condition for full allowance.

Allowable Claims

The Examiner has indicated that dependent Claims 7, 8 and 17-20 would be allowed if prepared in independent form.

Rejections under 35 U.S.C. § 103

Claims 1, 3, 10, 11, 13, 14, 22 and 23 are rejected as being obvious in view of U.S. Pat. No. 5,740,547 by *Kull et al*, in view of U.S. Pat. No. 5,554,982 by *Shirkey et al*. Independent claims 1, 11 and 22 each specify a data base of the collision avoidance system that stores train grade crossing data. Independent claim 23 specifies a processor and data base identifying intersections where railroad tracks intersect roads. One example of a train grade crossing is where a motor vehicle highway, street or road directly intersects a railroad track. (See the captioned application, pg. 2, lines 8-9).

In the *Office Action*, it is stated that the *Kull et al* reference discloses a data base storing train grade crossing data, as set forth in the abstract thereof. On a close examination of the *Kull et al* patent reference, there is no suggestion that the track data base stores such type of data. While the claims of the captioned application relate to a train collision avoidance system for avoiding collisions with road vehicles, the *Kull et al* reference is concerned only in the location of a train on the track system. Hence, the storing of data in the *Kull et al* track data base relating to intersections between railroad tracks and roads, would not facilitate the location of the train on the track system. Stated another way, even if the *Kull et al* track data base stored data of the train grade crossings, there are no sensors on the train which detect such type of crossings for comparison with the data base to determine the location of the train on the track system.

According to the technique disclosed in the *Kull et al* reference, the track data base stores data concerning the location and orientation of the track curves and the track switches, as well as track identifiers. Sensors on the train sense when the train is on a curve or when the train has switched tracks, and then when comparing such information with the data base, the location of the train is known. This location information is also used in conjunction with the GPS system which provides the approximate location of the train. As noted above, there are no sensors on the train for sensing when a train has passed by a road crossing so that such information could be compared with the data base.

In the rejection, the *Office Action* indicates that the *Kull et al* reference does not mention the use of GPS vehicle location data to identify the location of a vehicle, but that the *Shirkey et al* reference does. Moreoever, the *Office Action* indicates that it would have been obvious to one skilled in the art to modify the *Kull et al* reference to incorporate the teachings of the *Shirkey et al* reference to provide a proximity alert system to prevent a collision. The *Kull et al* reference does not even mention that the invention described therein has anything to do with collision avoidance with road vehicles. Rather, the rail navigation of the *Kull et al* reference simply determines the location of the locomotive or train without regard to railroad crossings or road vehicular traffic. At column 7, between lines 9 and 15, the *Kull et al* reference indicates that the navigation system described therein can be used to facilitate train separation and future train-handling systems in which a computer operates the train under the supervision of an engineer.

Accordingly, to incorporate road vehicle traffic safety considerations and equipment into the teachings of the *Kull et al* reference, would extend the reference well beyond any suggestion therein. As such, it would not have been obvious to one skilled in the art to combine the teachings of the *Shirkey et al* reference into the *Kull et al* reference for the reasons noted above.

Accordingly, because there is no suggestion for storing train grade crossing data in the track data base of the *Kull et al* system, independent Claims 1, 11, 22 and 23 are not made obvious by the cited prior art.

Independent Claim 1 is not made obvious by the cited prior art for the additional reasons set forth below. Claim 1 specifies a data base storing in association with the train grade crossing data, data that

indicates the heading of a road. By storing data indicating the heading of a road that intersects with the railroad track, a more reliable indication can be provided indicating the possibility of a collision between the train and the vehicle. The Examiner does not indicate where such claim limitation is suggested in the *Kull et al* or *Shirkey et al* references, and the applicant is unable to also determine where such limitation is made obvious. Accordingly, it is submitted that a *prima facie* case of obviousness has not been established with regard to Claim 1.

Claim 1 also specifies a processor that is programmed to correlate the heading data of the road stored in the data base, with the heading of a road vehicle. This limitation of Claim 1 is neither suggested nor disclosed in either the *Kull et al* or *Shirkey et al* patent references. For this additional reason, a *prima facie* case of obviousness has not been established with regard to Claim 1.

Claim 11 specifies the use of a direction sensing device for providing data indicating the heading of a vehicle, which vehicle is not a train. Claim 11 further specifies a processor that is programmed to provide a sensory indication....when, interalia, the heading of the vehicle will cause the vehicle to intersect the grade crossing. One reason for taking into consideration the heading of the road vehicle is that even if the vehicle is within the proximity of a train near an intersection, but the vehicle is heading away from the intersection, there is no imminent harm of a collision and no need to then provide the sensory warning.

As noted above in connection with the *Kull et al* patent reference, all of the sensors and data gathered are in connection with the locomotive, not a road vehicle. As such, no heading of a road vehicle is either generated or needed in conjunction with the *Kull et al* rail navigation system.

While the *Shirkey et al* patent reference does disclose a vehicle proximity alert system (VPAS) which uses a GPS receiver for determining the vehicle's geographic location, there is no suggestion whatsoever that the claimed heading of the road vehicle is ever generated or involved. It can be seen from FIGS 2 and 3 of the *Shirkey et al* reference, that the warning zone (broken line) includes boundaries on both sides of the railroad tracks. Accordingly, when a vehicle has passed over the tracks and is out of danger, but is nonetheless within the warning zone, the vehicle alert will continue to alarm the driver. This can be a source of confusion and may be dangerous, especially if railroad tracks are in close proximity so that warning zones

overlap: A driver of a road vehicle having crossed over one track may not pay any attention to the sounding alarm, and not realize that the vehicle is entering the warning zone of another crossing where a train is approaching. By utilizing the heading of the vehicle, as claimed, a false sense of security can be avoided by removing the sensory indication after the vehicle has passed the train tracks. Once the vehicle has passed over the tracks, the sensory warning can be silenced even though the vehicle is in the immediate vicinity of the train and the crossing, i.e., the train and crossing are behind the vehicles.

For the foregoing reasons, neither the *Kull et al* or the *Shirkey et al* reference suggests the use of the heading of the road vehicle to provide a sensory indication. As such, a *prima facie* case of obviousness has not been established with regard to Claim 11.

With regard to Claim 22, there is specified the limitation of a method step of reading from a data base .....data identifying a heading of at least one road intersecting the train grade crossing. The Examiner does not indicate where in the references there is any disclosure of the use of the heading of the vehicle or the direction of travel of the vehicle. Again, and as noted above in connection with the *Kull et al* reference, the presence or non existence of roads is irrelevant to the operation of the rail navigation system disclosed therein. While the *Shirkey et al* reference discloses apparatus attempting to prevent collisions between trains and vehicles at grade crossings, there is no disclosure that any data base exists which stores data identifying a heading of a road intersecting the train grade crossing.

Secondly, Claim 22 specifies method steps involving the use of the direction of travel of the vehicle. For the same reasons noted above in connection with Claim 11, which specifies the "heading" of the vehicle, Claim 22 is also patentable over the references insofar as such claims specifies the direction of travel of the vehicle. For these reasons, a *prima facie* case of obviousness has not been established with regard to Claim 22.

With regard to Claims 1 and 11 and 22 , the following is pertinent. As noted above, Claim 1 specifies a data base storing in association with train grade crossing data, heading data of a road. In the *Office Action* at the bottom of page 4 thereof, it is conceded that neither the *Kull et al* nor the *Shirkey et al* references disclose the use of data identifying the direction of a road which intersects a railroad track at the grade crossing. As such, this is additional evidence of the nonobviousness of such claims.

The Examiner also indicates that such claim limitation is disclosed in U.S. Patent No. 3,758,775 by *Hopkins*. In the *Hopkins* reference, at the location indicated by the Examiner at the bottom of page 4 of the *Office Action*, there is no suggestion of storing data in a data base corresponding to the heading or direction of a road that intersects a railroad track. Rather, the *Hopkins* reference discloses the use of a plurality of sensors located at the railroad crossing for sensing the presence of an automobile stalled on the tracks. When a stalled vehicle is sensed, a transmitter signal is suppressed, whereby a receiver at the crossing is activated. An oncoming locomotive is also notified of the stalled vehicle.

Independent Claim 23 specifies, among other limitations, a processor programmed to define an envelope of protection circumscribing the road vehicle so that the envelope for protection moves with the road vehicle. In the *Office Action*, it is not indicated where in either of the *Kull et al* or *Shirkey et al* reference such a limitation is suggested. As disclosed in the *Shirkey et al* reference, the envelope for protection 50 (Fig. 2,) is defined as coordinates around the grade crossing, which is stationary. In other words, the zone of protection around the grade crossing is stationary, and does not move with the vehicle, as claimed. At page 4 of the *Office Action*, paragraph 4, the Examiner indicates in connection with the rejection of Claims 6 and 9, that the *Kull et al* and *Shirkey et al* references do not mention the provision of a radius of protection around the vehicle. As such, this admission establishes on the record the nonobviousness of Claim 23.

In the *Office Action* at page 4 thereof, where Claims 6 and 9 are rejected, it is noted that the *Gersberg et al* reference discloses the provision of a radius of protection around the vehicle and the radius is defined by a predefined distance. On a detailed review of the *Gersberg et al* reference, it is noted that the coverage area 22 (Fig. 2) is achieved by sensors buried in the ground around the railroad crossing. The sensors sense the metallic portions of the automobiles that may be stuck in the intersection to thereby alert oncoming locomotives of the same. Although an area of coverage is suggested in the *Gersberg et al* reference, such area of coverage is fixed and does not move with the vehicle, as claimed. For this additional reason, the cited prior art does not make obvious the invention of Claim 23.

For the foregoing reasons, a *prima facie* case of obviousness has not been established with regard to independent claim 23.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

Conclusion

From the foregoing, it is submitted that all claims of the application are clearly nonobvious in view of the cited prior art. The Examiner is respectfully requested to reconsider the rejections of the claims in view of the comments made of record, and grant full allowance of the application.

Please charge any additional fees or deficiencies in fees or credit any overpayment to Deposit Account No. 20-0780/DVSS-25,152 of HOWISON, CHAUZA, THOMA, HANDLEY & ARNOTT, L.L.P.

Respectfully submitted,

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